Half-life of the 6.3-keV isomer in ^{121}Sn

G. A. Rech,[1] E. Browne,[1] I. D. Goldman,[2] F. J. Schima,[3] and E. B. Norman[1]
[1]Nuclear Science Division, Lawrence Berkeley National Laboratory, Berkeley, California 94720
[2]Instituto de Fisica, Universidade de Sao Paulo, Sao Paulo, Brazil
[3]National Institute of Standards and Technology, Gaithersburg, Maryland 20899

We measured the half-life of ^{121m}Sn and have obtained a value of 43.9±0.5 yr. In the same experiment we measured a half-life of 21.8±0.3 yr for ^{210}Pb. This latter result agrees well with the recommended value of 22.3±0.2 yr [6] and thus confirms the good performance of our equipment and adequate analysis of our data.

The half-life of ^{121m}Sn was determined by measuring the decrease in the 37.1-keV γ-ray count rate over a period of 1.2 years (Fig.1). Since such a change is expected to be about 1.5%, good statistics (more than ≈1x10^6 events in the peak) and a precise reckoning of the spectral areas are required as well as a stable response of the data acquisition system. Because of its long and well known half-life of 432.2 ± 0.7 yr [8] we used the 59.5-keV peak from ^{241}Am α decay to test the stability of the electronics and to correct the data for systematic errors that could have originated from changes in the Ge detector response. Our measured ^{121m}Sn half-life is consistent with that calculated on the basis of the systematics of M4 isomeric transitions in ^{117}Sn and ^{119}Sn, which supports the $h_{11/2}$ assignment to the 6.3-keV isomer in ^{121}Sn.

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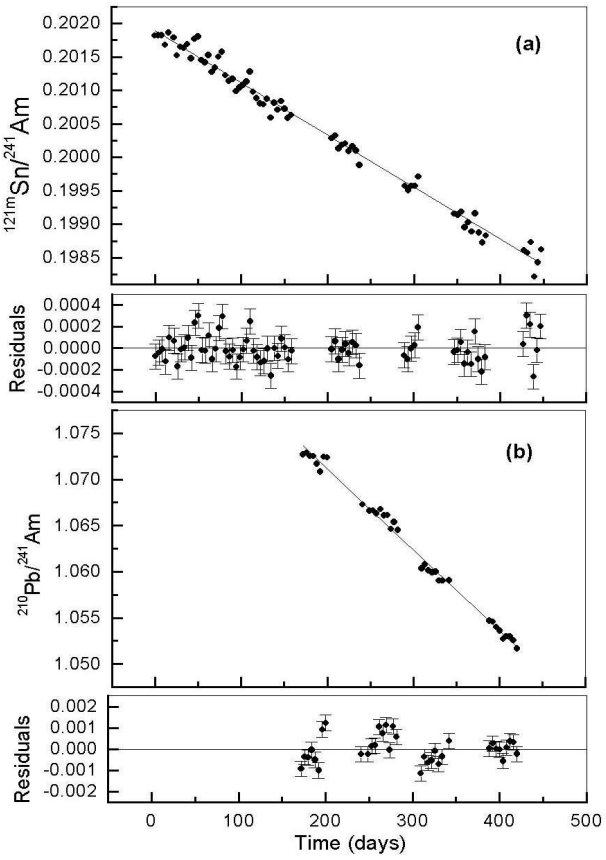

Figure 1. Measured decay curve for (a) ^{121m}Sn/^{241}Am, and (b) ^{210}Pb/^{241}Am. The differences between measured and fitted values are shown as residuals. The half-life values determined from these fits are (a) $t_{1/2}$(^{121m}Sn)=43.9±0.5 yr, and (b) $t_{1/2}$(^{210}Pb)=21.8±0.3 yr.